

Spot Safety Project Evaluation

Project Log # 200512159

Spot Safety Project # 05-98-230

**Spot Safety Project Evaluation of the Traffic Signal Installation
At the Intersection of SR 1010 (Ten Ten Rd) and
SR 1386 (Graham Newton/Bells Lake Rd)
Wake County**

Documents Prepared By:

Safety Evaluation Group
Traffic Safety Systems Management Section
Traffic Engineering and Safety Systems Branch
North Carolina Department of Transportation

Principal Investigator

Brad Robinson, EI

11/20/2006
Date

Traffic Safety Project Engineer

Spot Safety Project Evaluation Documentation

Subject Location

Evaluation of Spot Safety Project Number 05-98-230 – The Intersection of SR 1010 (Ten Ten Rd) and SR 1386 (Graham Newton/Bells Lake Rd) in Wake County.

Project Information and Background from the Project File Folder

The spot safety project improvement countermeasure chosen for the subject location was the installation of a fully actuated traffic signal. SR 1010 (Ten Ten) and SR 1386 (Graham Newton/Bells Lake Rd) are both 2-lane roads with no left-turn lanes and speed limits of 45. The southbound leg of SR 1386 (Graham Newton Rd) has a traffic island creating a right turn slip ramp at the intersection. Both legs of SR 1386 had dual-indicated stop signs in the before period.

The original statement of problem was that due to congestion on SR 1010 drivers had difficulty finding acceptable gaps to make turning maneuvers. A citizen originally submitted a request for the traffic signal.

The initial crash analysis was completed from March 1, 1995 to February 28, 1998 with 14 reported crashes, including 10 that were considered correctable by the chosen countermeasure. The final completion date for the improvement at the subject intersection was on May 13, 1999 with a total cost of \$30,000.

Naive Before and After Analysis

After reviewing the spot safety project file folder along with all the crashes at the subject location, the crash data omitted from this analysis to consider for an adequate construction period was from April 1, 1999 to June 30, 1999. The before period consisted of reported crashes from May 1, 1992 through March 31, 1999 (6 years and 11 months) and the after period consisted of reported crashes from July 1, 1999 through May 31, 2006 (6 years and 11 months). The ending date for this analysis was determined by the available crash data at the time the analysis was completed.

The treatment data consisted of all crashes within 150 feet of the subject intersection. *Please see attached location map and photos for further details.*

The following data table depicts the Naive Before and After Analysis for the treatment location. Please note that Frontal Impact Crashes were the target crashes for the applied countermeasure. The Frontal Impact Crash types considered are as follows: Left turn, same roadway; Left turn, different roadways; Right turn, same roadway; Right turn, different roadways; Head on; and Angle. One Ran-Off-Road Crash was included as a target crash in the after period that involved a driver swerving to avoid a Frontal Impact Crash.

<u>Treatment Information</u>			
	Before	After	Percent Reduction (-) Percent Increase (+)
Total crashes	31	22	-29.0
Total Severity Index	11.68	4.7	-59.8
Target Crashes	22	4	-81.8
Target Crash Severity Index	10.58	4.7	-55.6
Volume	12,400	17,400	40.3
<u>Injury Summary</u>			
Fatal injuries	0	0	N/A
Class A injuries	4	0	-100.0
Class B injuries	6	3	-50.0
Class C Injuries	21	13	-38.1
Total Injuries	31	16	-48.4

The naive before and after analysis at the treatment location resulted in a 29 percent decrease in Total Crashes, an 82 percent decrease in Target Crashes, a 60 percent decrease in the Total Severity Index, and a 40 percent increase in Average Daily Traffic (ADT). The before period ADT year was 1995 and the after period ADT year was 2002.

Results and Discussion

The naive before and after analysis involving the comparison of treatment actual before data versus treatment actual after data resulted in a 29 percent decrease in Total Crashes and a 82 percent decrease in Target Crashes, with a 40 percent increase in ADT. The Total Severity Index decreased by 60 percent and the Target Crash Severity Index decreased by 56 percent. The summary results above demonstrate that both Total Crashes and Target Crashes appear to have decreased at the treatment location from the before to the after period.

Referencing the *Collision Diagram, Before Period*, there were patterns of Frontal Impact Crashes for all combinations of travel between SR 1386 and SR 1010. At least eight of these crashes involved a vehicle running the stop sign, which was determined by the crash report explicitly stating that a vehicle ran the stop sign. In the after period there were no target crashes between vehicles traveling on different roads.

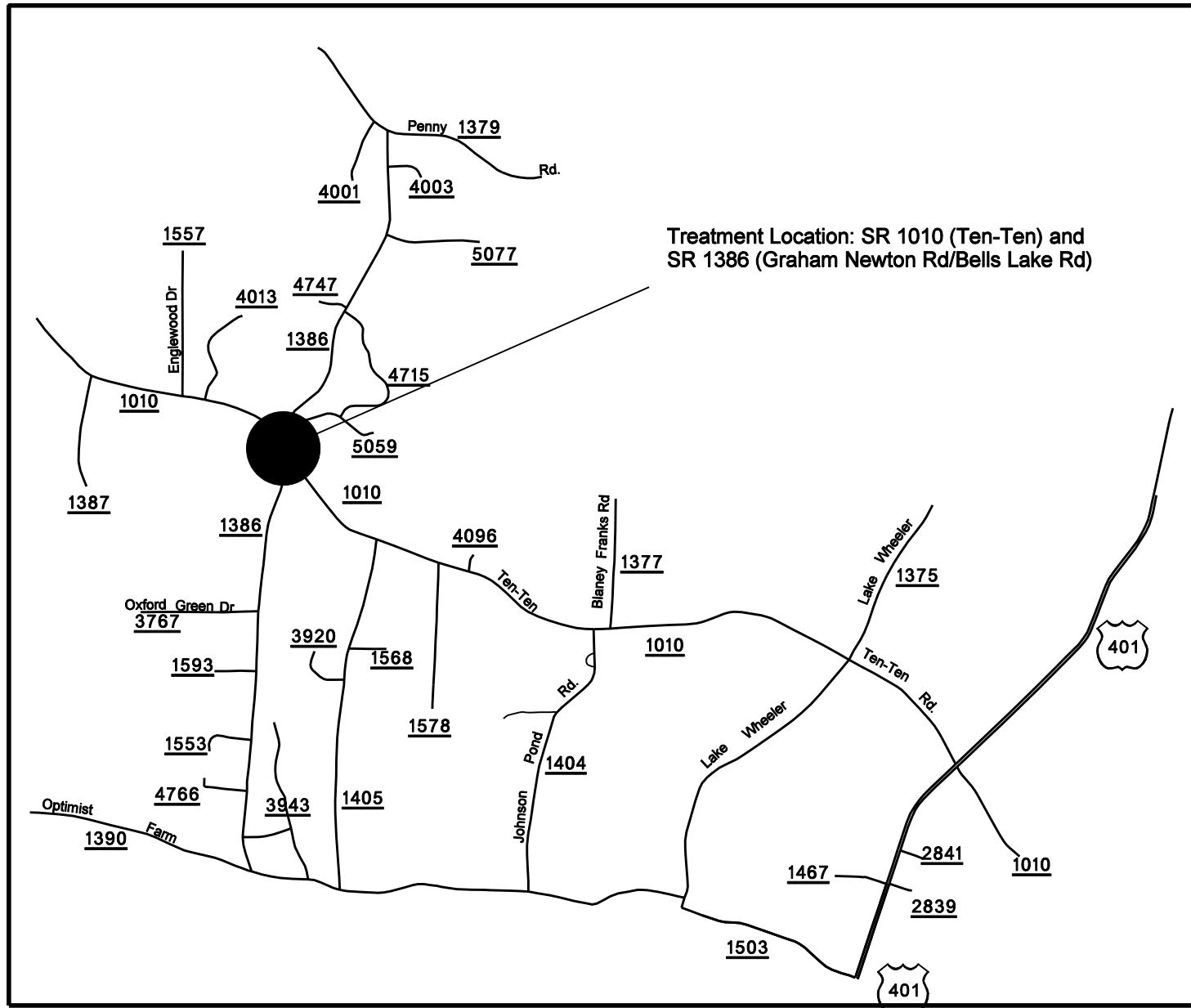
The only type of Frontal Impact Crash in the after period were Left-Turn, Same Roadway Crashes. There were three Left-Turn, Same Roadway Crashes involving vehicles on SR 1386 and one Left-Turn, Same Roadway Crash involving vehicles on SR 1010. (One of the SR 1386 crashes was actually a Ran-Off-Roadway Crash, but was included because it was the result of a driver swerving to avoid a Left-Turn, Same Roadway Crash.) In the before period there was only one Left-Turn, Same Roadway crash, which involved vehicles on SR 1010.

Patterns of Rear-End Crashes developed on both directions of travel on SR 1010 in the after period. Westbound Rear-End Crashes increased 400% (from 1 to 5) and eastbound Rear-End Crashes increased 250% (from 2 to 7).

Please see the attached *Treatment Site Photos*. Photos are provided for all approaches to the treatment intersection.

As the Safety Evaluation Group completes additional spot safety reviews for this type of countermeasure, we will be able to provide objective and definite information regarding actual crash reduction factors for this type of intersection.

Location Map Wake County Evaluation of Spot Safety Project #05-98-230



Treatment Site Photos Taken October 11, 2006



Traveling Eastbound on SR 1010



Traveling Eastbound on SR 1010



Traveling Westbound on SR 1010



Traveling Westbound on SR 1010



Traveling Northwest on SR 1386 (Bell's Lake Rd)



Traveling Northwest on SR 1386 (Bell's Lake Rd)

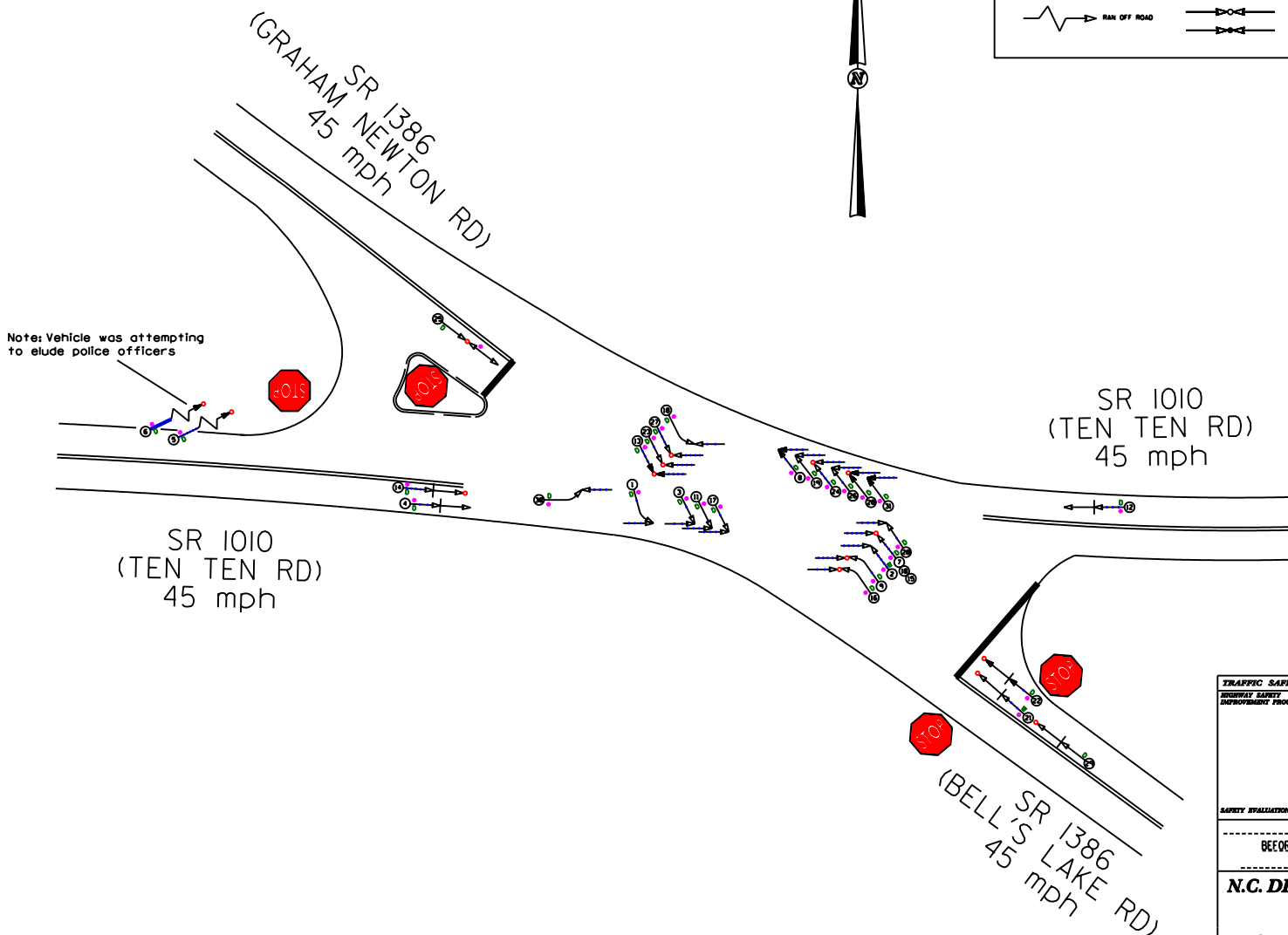
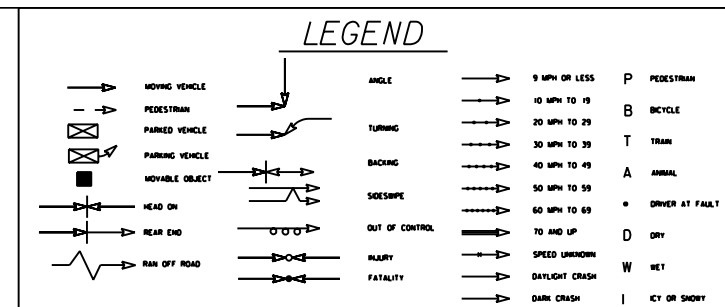


Traveling Southeast on SR 1386 (Graham Newton Rd)



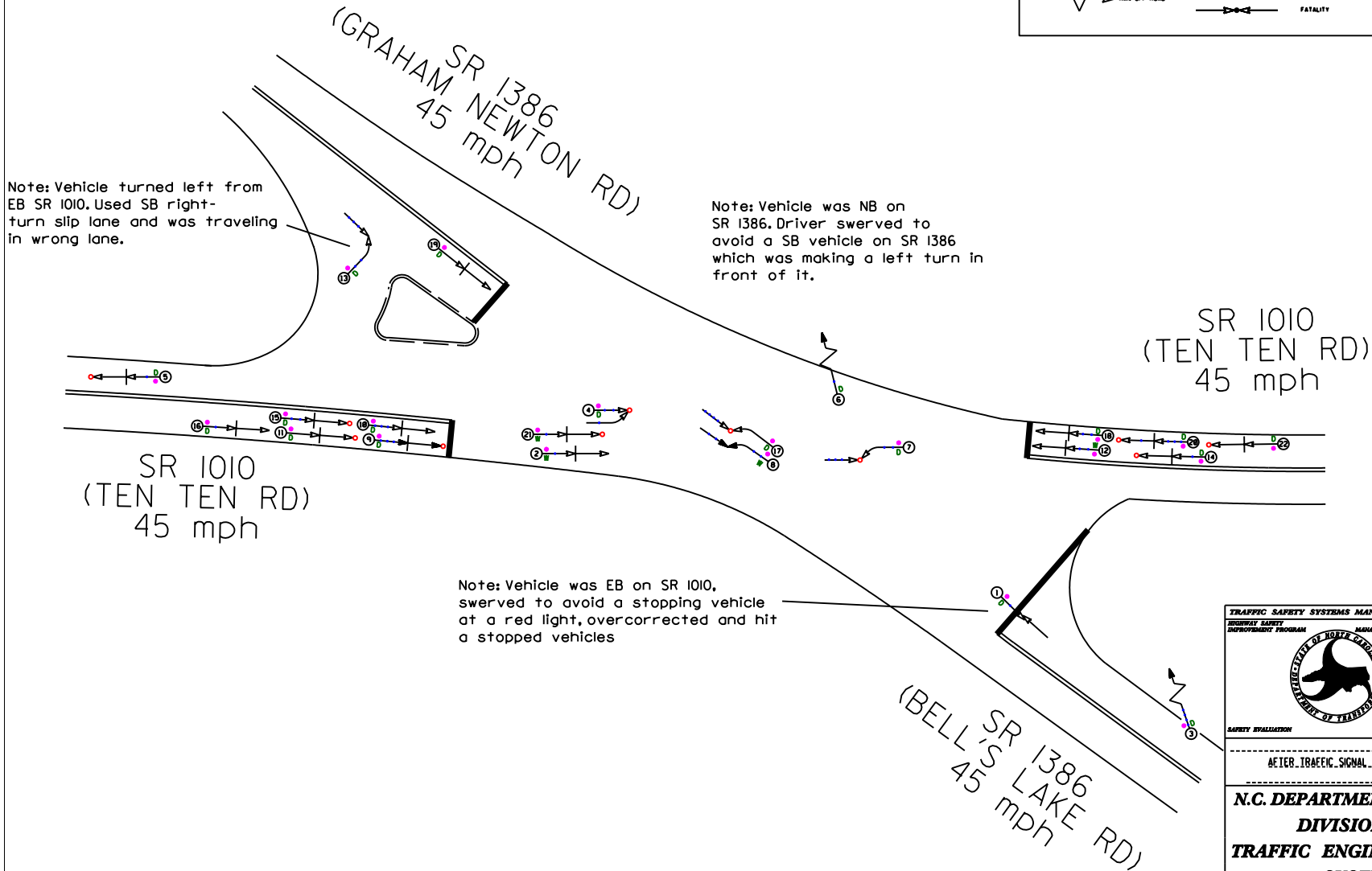
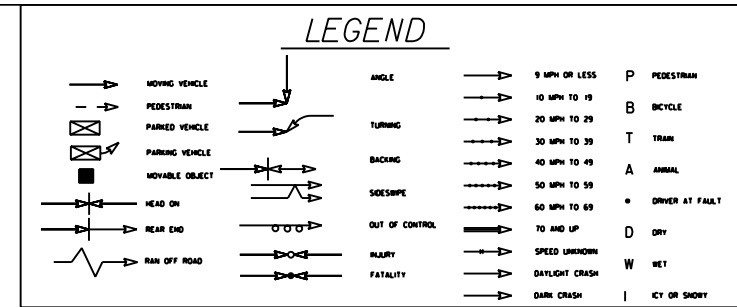
Traveling Southeast on SR 1386 (Graham Newton Rd)

Wake County
 SR 1010 (Ten Ten Rd) at
 SR 1386 (Graham Newton Rd/Bells Lake Rd)
 Treatment Site in the
 Before Period (5/1/1992 - 3/31/1999)



TRAFFIC SAFETY SYSTEMS MANAGEMENT UNIT <small>ROADWAY SAFETY IMPROVEMENT PROGRAM</small>		COLLISION DIAGRAM <small>SAFETY INFORMATION MANAGEMENT AND SUPPORT</small>	
		DIVISION: 5	AREA: ..
		STUDY PERIOD: 5/1/1992 TO 3/31/1999	
		DISTANCE: Y-LINE: 150 FT	
		ANALYSIS PREPARED BY: B.Booth0900	
		DIAGRAM PREPARED BY: B.Booth0900	
SAFETY EVALUATION		TRAFFIC SAFETY	
BEFORE TRAFFIC SIGNAL INSTALL		SCALE: NOT TO SCALE	
LOG NUMBER: 20050259		DATE: Oct1999c.2006	
N.C. DEPARTMENT of TRANSPORTATION DIVISION of HIGHWAYS TRAFFIC ENGINEERING AND SAFETY SYSTEMS BRANCH			

Wake County
 SR 1010 (Ten Ten Rd) at
 SR 1386 (Graham Newton Rd/Bells Lake Rd)
 Treatment Site in the
 After Period (7/1/1999 - 5/31/2006)



TRAFFIC SAFETY SYSTEMS MANAGEMENT UNIT		COLLISION DIAGRAM	
ROADWAY SAFETY	SAFETY INFORMATION	DIVISION: 5	AREA: ..
DEVELOPMENT PROGRAM	MANAGEMENT AND SUPPORT	STUDY PERIOD: 7/1/1999 TO 5/31/2006	
		DISTANCE:	Y-LINE: 150 FT
		ANALYSIS PREPARED BY: B. BOBROSIO	
		DIAGRAM PREPARED BY: B. BOBROSIO	
		DIAGRAM REVIEWED BY:	
SAFETY EVALUATION		TRAFFIC SAFETY	
AFTER TRAFFIC SIGNAL INSTALL		SCALE: NOT TO SCALE	
		DATE: OCTOBER 2006	
		LOG NUMBER: 20050259	
N.C. DEPARTMENT of TRANSPORTATION DIVISION of HIGHWAYS TRAFFIC ENGINEERING AND SAFETY SYSTEMS BRANCH			